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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 09/623,268
Filing Date: August 30, 2000
Appellant(s): FILSER ET AL.

Charles Gorenstein (Reg. No. 29,271)
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed January 19, 2010 appealing from the Office action mailed May 18, 2009.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

No amendment after final has been filed.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

6,106,747	WOHLWEND	08-2000
6,287,121	GUIOT	9-2001

Halloran, J.W., Appellants' Exhibit A - "The John Halloran Letter" dated April 6, 2004, made of record by Appellants on May 3, 2004

Glass, S.J. et. al., "Ceramic Powder Compaction" Conference proceedings" American Ceramic Society International Symposium on Manufacturing Practices and Technology, 5-8 Nov. 1995, pp 1-16

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 16-34, 41-43, and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wohlwend (US 6,106,747) in view of Applicant's Exhibit A: the John Halloran letter dated 6 April 2004 (supplied to the PTO in the response of 5/3/2004).

Wohlwend teaches (Column 1, lines 55-65) a method for forming dental prostheses having precise dimensions. In general, the reference teaches that a form for the prosthetic is "profiled" from a prepared block of material by cutting the desired shape in enlarged dimensions to "compensate for shrinkage during sintering". This enlarged form is subsequently sintered to the density and hardness required for the end use application.

The specific process disclosed by Wohlwend (Column 3, lines 24-42 and Column 4, lines 51-54) includes the steps of:

1. Processing ceramic to form a "homogeneous" blank of ceramic material (see Column 3, lines 45-63; claim 3, and claim 5) from powdered ceramic materials
2. Scanning and digitizing the dimensions of a positive model of a skeletal structure (Column 3, Lines 34-38);
3. Enlarging the dimensions of the model by "the appropriate enlargement factor" (Column 3, lines 40-43);
4. Transferring the enlarged dimensions to a porous ceramic blank via material removal (Column 3, Lines 40-42 and col. 3, lines 54-60)
5. Dense sintering the blank; and (Column 1, Lines 63-65, Claim 1,and Claim 7)
6. Facing the blank with a coating material (Column 4, lines 48-58).

Although Wohlwend does not explicitly teach "linearly" enlarging the dimensions "in all directions" as claimed, the reference does disclose applying the enlargement factor to the digitized prosthetic dimensions in order to "compensate for shrinkage during sintering". One of ordinary skill in the art equipped with the Wohlwend teachings would either find the linear compensation an implicit component of the instant reference or would alternatively recognize said "linear" enlargement "in all directions" as a merely obvious extension over the prior art.

Wohlwend does not explicitly limit the enlargement factor to conform the formula presented in Claims 16, 32, and 33.

It is instructive here to examine the Applicants enlargement factor to understand its intuitive and obvious mathematical basis. First Applicant teaches a material density prior to sintering, ρr or "the relative density, and a post-sintering density, ρs or "the achievable relative density". Assuming conservation of mass, the fraction $\rho s/\rho r$ is simply a mathematical representation for fractional volume shrinkage for the ceramic body from the pre-sintering stage to the post-sintering stage. The cube root of the volume ratio merely reduces the volumetric contraction ($\rho s/\rho r$) into a linear vector quantity which one of ordinary skill would recognize an obvious and natural form for scaling a digital representation (read x,y,z coordinates) of a volumetric body. Restated, although Wohlwend does not explicitly set forth the details of Applicants claimed enlargement factor, said enlargement factor details appear on their face to merely state an obvious solution to the enlargement operation contemplated and disclosed by Wohlwend.

The Halloran letter teaches the level of ordinary skill in the art at the time of the invention with respect to ceramic shrinkage during sintering and specifically the ordinary level of skill with respect to the "enlargement factor". To this end, Halloran explicitly states;

a. Ceramic engineers *routinely consider the shrinkage during fabrication*…moulds, tools, CAD dims, etc. are routinely made larger by "enlargement factors"…*This is a normal part of the ceramic art*, and *need not be specified in detail*.
b. Also well known in the art…the *enlargement factor is computed from starting density and sintered density*.
c. *It is commonly understood* that the reproducibility of the dimensions of the finished ceramic article depends upon the starting density, so *efforts are made to control this factor as part of the ordinary practice of ceramic manufacture*.

In short, Halloran teaches that it is a merely routine operation for a skilled ceramic engineer to compute enlargement factors by taking into account the starting density ("relative density") and final density ("achievable relative density") of a ceramic material. Further, one having an ordinary level of skill in the art would necessarily undertake steps to "control" the precision (e.g. calculating f to 4 decimal places) of the enlargement factor as a routine quality control measure to insure "the reproducibility of the dimensions of the finished ceramic article". Finally and most importantly, Halloran instructs that the calculation of "enlargement factors" are such a trivial matter and so notoriously well known in the art that they "need not be specified in detail".

Therefore, although Wohlwend may not specify the particular details of the enlargement factor as claimed by Applicant, the Halloran letter teaches that the claimed enlargement factor is a merely obvious extension over the prior art. Specifically, Halloran discloses that calculation of the enlargement factor is a "normal part of the ceramic art" and "need not be specified in detail". It follows that Applicants explicit rendering of these calculation details is insufficient to patentably distinguish the claimed invention over method disclosed in the prior art.

Similarly, the Wohlwend reference teaches a single iteration of the disclosed steps for fabricating a single tooth. Although the Wohlwend reference does not expressly require repeating all process steps for each artificial tooth substitute to be produced, such a repeated process would clearly fall within the purview of a skilled practitioner in the arts. Specifically, one of ordinary skill in the arts would be motivated to repeat all process steps including, *inter alia*, a step of calculating the enlargement factor as a routing quality control initiative. Restated, where the Wohlwend reference teaches essentially every feature of Applicants claimed process, an explicit requirement to repeat all of said steps would represent a trivial extension over the prior art for one of ordinary skill in the arts.

The Examiners position on this matter is supported by the Halloran letter which states in part that the engineers "*routinely consider the shrinkage during fabrication*", and that such a factor is "Also well known in the art…(and) *computed from starting*

density and sintered density". Finally, Halloran indicates that controlling the enlargement factor is *" part of the ordinary practice of ceramic manufacture".*

With respect to newly presented **Claim 45**, the prior art of record is silent regarding a step wherein data for the enlargement factor (f), to be detectable optically, electromagnetically or mechanically-tactile, is applied on the blank, an attachment label or a package leaflet and wherein an identification system reads the data applied on the blank.

Regarding the instant limitation, Applicant will appreciate that the use of labeling and information reading systems are notoriously well known in manufacturing and retail environments. Industrial inventory management systems are replete with examples wherein a material or product is labeled with identifying or other useful information and an information reading system is utilized to automate or otherwise facilitate a processing of the product information. For example, barcode systems are routinely employed in nearly every modern retail setting wherein a barcode or tag containing, inter alia, a products identity as well as additional information such as price per unit is attached to a product. This tagging system is typically paired with an information reading system which automates data entry and facilitates subsequent data processing. Similar labeling and information retrieval systems are further contemplated for labeling of workpieces and tools in product manufacturing environments (see for example Hewkin et. al., IEE review, (1989), pp. 203-206)

In short, Applicants recited application of processing data to an individual workpiece and the use of an identification system for reading said data is notoriously old in the art. Although the prior art is silent regarding application of such a system to the manufacture of dental prosthetics, such a protocol does not patentably distinguish the claimed invention in view of the ordinary level of skill in the art at the time of the invention. Although the above noted exemplary applications of such labeling technologies are not directly employed in dental prosthetic manufacture, a known work in one field may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations are predictable to one of ordinary skill in the art. In the instant case, one of ordinary skill would have been motivated to make such a modification in order to achieve increased product reliability, to enhance product throughput, and to reduce probability of production errors. It follows therefore that Applicants recited method constitutes no more than application of a known technique, namely inclusion of a workpiece labeling and label reading method, to a known method for manufacturing dental prosthetics which is ready for improvement to yield a wholly predictable result.

3. Claim 44 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wohlwend (US 6,106,747) and the John Halloran letter as applied to Claim 1 above in further view of Guiot et. al. (US 6,287,121).

The prior art of record is silent regarding a step wherein " a positive model reflecting incompletely a situation in a patients mouth is supplemented with regard to the three-dimensional outer and inner surfaces by computer technology"

Regarding the newly recited limitations in Claim 44, Applicants Specification states that a negative model of the situation in a patients mouth is produced which in turn is used to produce a positive model." This passage continues by acknowledging that "This procedure is known and is used in dental technical practice", and that "the process according to the invention follows this known preliminary stage and digitizes completely the outer and inner surface of the skeletal structure model or the surface on the positive model.

Regarding the recited steps of digitizing and supplementing the digital model with "computer technology", Applicants Specification states that "Processes for digitization in the mouth of a patient on a prepared dental stump or a model are known for example from US, A 418312 (mechanical) and EP, B1 0054785 (optical)".

Although the excerpts from Applicants originally filed Specification are construed as an admission that each step of the formation of a positive model, and 2) digitization of said model, including the step of supplementation by computer technology, are known and conventional techniques in the art, Applicants recited method is made explicit in the United States patent to Guiot et. al. (US 6,287121).

Guiot is directed to a method for preparation of dental prosthesis comprising steps of formation of a positive model of a patient's teeth and digitization of that model for subsequent machining of the prosthetic. The reference explicitly recognizes (col. 3, lines 44-60) that the conventional modeling techniques result in inaccuracies or a model which reflects incompletely the situation in a patient's mouth. In response, Guiot teaches that it is known to supplement this computer data with individual duplicate sections of inner or outer surfaces in order to achieve a more accurate digital representation of the situation in the patient's mouth (col. 3, line 61- col. 4, line15). In view of the Guiot reference, one of ordinary skill in the art would have found it obvious to supplement an incomplete model of a patients mouth with additional data regarding the three dimensional outer and inner surfaces and to combine that data by way of computer technology as recited in claim 44, lines 16-19.

4. Claim 46 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wohlwend (US 6,106,747) and the John Halloran letter as applied to Claim 1 above in further view of Glass et. al. (Conference proceedings: American ceramic Society International Symposium on Manufacturing Practices and Technology, 5-8 Nov. 1995)

The prior art of record is silent regarding a step wherein an outer layer of the blank of porous ceramic material selected in step (1) is removed in order to remove any existing density gradients in an outer material shell.

Regarding the nature of density gradients in ceramic compacts, Glass states that "Density gradients created during forming (e.g. due to die wall friction) are undesirable as they promote differential or heterogeneous densification within the ceramic body, which often results in warping and cracking during sintering" (Glass - pg 2). Glass continues by noting that "The key to achieving a net-shape compaction process is to minimize or eliminate macroscopic density gradients in the particulate assembly during die filling and compaction" (pg 3 – Glass). Regarding the predictability of density distribution a pressed ceramic powder compact, Glass indicates that density distribution follows a predictable course (see figures 2 and 3 and page 4) with the highest densities in the top coroners, the lowest density in the bottom corners and that a radial gradient is established from "a high density at the edges to a lower density along the cylinder axis".

Glass explicitly recognizes that a homogeneous density profile is of primary importance to reducing warping and cracking during sintering. Further, the Glass reference makes plain that the density distribution in ceramic compacts vary in a known and predictable fashion with the noted formation of a high density outer shell on the ceramic compact. It follows that one having no more than an ordinary level of skill in the art would have been motivated to try Applicants recited step of "removing an outer layer

of the blank of porous ceramic material" in order to enhance the density homogeneity in the ceramic blank. That is, such a processing step, which removes a high density outer skin from the ceramic compact, would have constituted an obvious and predictable approach to "minimize or eliminate density gradients in the particulate assembly". Further, one of ordinary skill would have been motivated to remove the high density outer layer as a means to minimize differential or heterogeneous densification and to thereby minimize warping and cracking of the ceramic body during the sintering step.

(10) Response to Argument

Argument #1)

Applicant alleges (see Appeal Brief page 14) that Wohlwend teaches the use of a purely empirical enlargement factor. Applicant further alleges that the disclosed enlargement factor is assumed to be constant in Wohlwend. Applicant concludes that Wohlwend teaches a "one size fits all", generic enlargement parameter for all blanks.

In support of the is position, Applicant points to Wohlwend column 3, lines 40-43 which states in pertinent part that;

> "This wax model (5) is then scanned using a copy-milling system (6) … , the data are stored in a computer (9), processed, and enlarged appropriately for the material being used, transmitted to a milling spindle

(8), which cuts a representation of the wax model (5) out of an oxide ceramic molded piece (10), enlarged by the appropriate enlargement factor.

In response to the arguments and in view of the above reproduced excerpt, Applicant is respectfully advised that the cited passages in the Wohlwend reference do not support Applicants stated position. Specifically, Wohlwend in no manner explicitly nor implicitly requires that the enlargement factors are (1) empirically derived, (2) that the enlargement factors are constant from blank to blank, nor (3) that there is a "one size fits all" enlargement factor as alleged by Applicant.

To the contrary, Wohlwend explicitly recognizes that "shrinkage of the form … is dependent upon the material or the treatment" performed upon the blank (see col. 2, lines 17-18) and that the modeled data are "enlarged appropriately for the material being used" (col. 3, line 39). Further, Wohlwend explicitly recognizes that the manner in which a perform is handled or treated during manufacture directly impacts the enlargement factor required to produce a prosthetic of desired dimension even for blanks made from the same materials. In short and in direct contrast to Applicants allegations, Wohlwend explicitly contemplates tailoring the enlargement factor to the specific material properties as well as the handling history of the blank, and in effect thereby advises against a "one size fits all" enlargement factor.

Further, Applicant is respectfully advised that the instant line of arguments are directed exclusively against the Wohlwend reference, while the rejection of claims is based upon the combined teachings to Wohlwend and Halloran under 35 U.S.C. §103(a).

With respect to the use of an enlargement factor tailored to the properties of each individual blank, Halloran states that "also well known in the art is that the enlargement factor is computed from the starting density", that the "starting density varies in ways well known for various fabrication methods", that "skilled ceramicists would be familiar with how to determine the relevant starting density", and that "since the starting density is an important attribute of ceramics, it is commonly measured by ceramicists". Where Halloran acknowledges that the enlargement factor is computed from the blank density and that the density varies in known ways and that density is a routinely measured parameter, it follows that measuring the density of each individual blank and adjusting the enlargement factor accordingly would constitute an obvious extension over the Wohlwend process for one of ordinary skill in the art at the time of the invention.

In view of the foregoing and in response to applicant's arguments against the Wohlwend reference individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Finally, regarding Applicants allegation that Wohlwend fails to teach calculating the enlargement factor for each blank, Applicant is advised that mere duplication of

process steps is prima facie obvious absent a compelling showing of unexpected results. To this end, calculating an enlargement factor for each individual blank amounts to no more than a routine quality control endeavor and such a protocol would reasonably have been derived by a skilled technician seeking to enhance product reliability and repeatability.

Argument #2)

Applicant alleges that the Examiner has exercised impermissible hindsight reconstruction in delineating the "intuitive and obvious mathematical basis" of Applicants claimed enlargement factor.

Specifically, Applicant takes issue with the Examiners assumption of conservation of mass during the sintering process. In support of this position, Applicant alleges that "conservation of mass "has nothing to do with the instantly claimed enlargement factor (f)" (see page 16, second paragraph). Applicant continues, in direct contradiction to the above allegation, by asserting that only the Appellants specification" discloses the preconditions of "(1) an exact mass conservation during sintering" and "(2) a blank with homogeneous distribution" (see page 16, last paragraph). Applicant further appears to state that the conservation of mass and use of a materially homogeneous blank are actually an inherent feature of the Wohlwend disclosed method (i.e. "As previously explained … , the Wohlwend factor only works with at least two preconditions: (1) an exact mass conservation during sintering has to be assumed; and

(2) a blank with homogeneous density distribution has to be provided" see Appeal Brief , page 16, second full paragraph).

In response to the above allegations, it is not at all evident to the Examiner how the concept of "conservation of mass" can at the same time (1) have "nothing to do with the claimed enlargement factor (f)", (2) be critical to Applicants disclosed invention, and (3) be inherent to the Wohlwend disclosure. Stated alternately, each of Applicants stated positions, namely that conservation of mass is inherent to Wohlwend, has nothing to do with Applicants invention, and is only recognized in Applicants disclosure appear to be incongrus on their face. In short, it is unclear to the Examiner precisely what conclusion Applicant is attempting to drawn from these disjoint, unsupported, and inconsistent conclusory statements.

The foregoing notwithstanding, Applicant is respectfully advised that the derivation presented in the prior official action has been set forth exclusively in order to delineate the obvious mathematical underpinnings of Applicants claimed enlargement factor. A rejection may take into account facts and sound scientific reasoning which are readily appreciated by those of ordinary skill in the art, including established scientific principles which are not explicitly disclosed in the cited prior art of record. See for example MPEP §2143.02 which states in pertinent part:

> "The rationale to modify or combine the prior art does not have to be expressly stated in the prior art; the rationale may be expressly or impliedly contained in the prior art or it may be reasoned from knowledge

> generally available to one of ordinary skill in the art, established scientific principles, or legal precedent established by prior case law. In re Fine, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); In re Jones, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). See also In re Kotzab, 217 F.3d 1365, 1370, 55 USPQ2d 1313, 1317 (Fed. Cir. 2000) (setting forth test for implicit teachings); In re Eli Lilly & Co., 902 F.2d 943, 14 USPQ2d 1741 (Fed. Cir. 1990) (discussion of reliance on legal precedent); In re Nilssen, 851 F.2d 1401, 1403, 7 USPQ2d 1500, 1502 (Fed. Cir. 1988) (references do not have to explicitly suggest combining teachings); Ex parte Clapp, 227 USPQ 972 (Bd. Pat. App. & Inter. 1985) (examiner must present convincing line of reasoning supporting rejection); and Ex parte Levengood, 28 USPQ2d 1300 (Bd. Pat. App. & Inter. 1993) (reliance on logic and sound scientific reasoning)."

In view of the foregoing and in response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

Finally, Applicant is respectfully advised that the assessment of obviousness regarding Applicants claimed enlargement ratio is confirmed and further supported in view of the Halloran letter as discussed below. That is, the rejection of claims is based upon the Wohlwend in view of Halloran. As repeatedly set forth in prior Official communications, Halloran explicitly states with respect to the enlargement factor a plurality of aspects including, inter alia, that ceramic engineers routinely consider the

shrinkage (of a ceramic perform) during fabrication, that it is well known that the enlargement factor is computed from starting density and sintered density, and that the calculation of an appropriate enlargement factor is so well known in the art that the particulars "need not be specified in detail".

To the Extent that Applicant alleges impermissible hindsight reconstruction of the claimed enlargement factor in view of the Wohlwend reference alone, Applicant is respectfully advised that the rejection is based upon the combined teachings of Wohlwend in view of Halloran and the ordinary level of skill in the art at the time of the invention under 35 U.S.C. 103(a).

Argument #3)

Applicant alleges (see Appeal Brief, page 16) that, in view of the Wohlwend reference, one of ordinary skill in the art "would never link the shrinkage to density".

On this point, the Examiner strongly disagrees.

Specifically with respect to a perform in the green, unsintered state, Wohlwend states that "the density and hardness of the material necessary for its use as a dental prosthesis are achieved only after roistering" (col. 1, lines 61-65) and that shrinkage of the form during sintering is dependent upon the nature of the material of the blank (col. 2, lines 17-18; col. 5, lines 11-34). It should appear evident in view of the foregoing excerpts that Wohlwend in fact does contemplate the relationship between the sintering

of a green ceramic perform, the increased density of said perform, and the shrinkage or reduction in size of said perform.

Further the Halloran Letter explicitly states that "Ceramic engineers routinely consider the shrinkage during fabrication" (see page 1, second paragraph) and that "also well known in the art is that the enlargement factor is computed from the starting and the sintered density". Again, it will appear self evident in view of Halloran that the relationship between ceramic perform density and shrinkage is a routine consideration in the ceramic arts that would be viewed as notoriously well known at the time of the invention.

Argument #4)

Applicant alleges that the Halloran letter does not constitute "prior art" since there is no proof that this reference was publicly available at the time of the invention. Applicant further alleges that the Halloran letter was created only after reviewing the present application.

In response, Applicant is respectfully directed to MPEP §2129 [R-6] for Official policy with respect to Applicants admission as prior art. Specifically, a statement by an applicant made during prosecution identifying the conventional practice in the art or the work of another at the time of the invention is an admission which can be relied upon for both anticipation and obviousness determinations, regardless of whether the admitted

prior art would otherwise qualify as prior art under the statutory categories of 35 U.S.C. 102. Riverwood Int 'l Corp. v. R.A. Jones & Co., 324 F.3d 1346, 1354, 66 USPQ2d 1331, 1337 (Fed. Cir. 2003); Constant v. Advanced Micro-Devices Inc., 848 F.2d 1560, 1570, 7 USPQ2d 1057, 1063 (Fed. Cir. 1988). The instant passage further explicitly notes that "In the absence of another credible explanation, examiners should treat such subject matter as the work of another."

In view of the foregoing, it follows that the Halloran letter may be properly relied upon as prior art to establish the conventional practice and methods employed by ceramicists at the time of the invention. No credible explanation has been proffered by Applicant to demonstrate or even suggest that the subject matter disclosed in the Halloran Letter is not in fact directed to the work of another.

Argument #5)

Applicant alleges that the Halloran letter is restricted to a showing that the enlargement factor "as defined in the patent application" was adequately described so that one of ordinary skill could make and or use the invention. Applicant further alleges that the Halloran letter has been misconstrued as it was "only provided to show that the skilled artisan is able to make use of the claimed invention". Finally Applicant alleges that Halloran is silent regarding the specific details of Applicants claimed enlargement factor (e.g. linear relationship, the homogeneity of the blank, the starting to final density ratio, or the cube root relationship) and that "the Examiner has not taken into account

the specific variables in the art or how one of ordinary skill in the art would be guided to the present invention".

In response, Applicant is in general agreement with Applicants assertion that the Halloran letter establishes that one skilled in the art would be able to make and or use the invention "as defined in the patent application". With respect to this matter and with reference to Applicants disclosed enlargement factor, Halloran states that "I think it is well specified".

However after confirming that the claimed invention is enabled by the Specification as originally filed, the Halloran letter then proceeds to establish the ordinary level of skill in the art at the time of the invention.

With respect to the ordinary level of skill in the art, Halloran explicitly states that it is well known to compute the enlargement factor from the starting density and the sintered density (see page 1, last paragraph). Halloran further notes that it is well known to account for variations in the starting density of the ceramic blank (e.g. homogeneity of the blank) and that "skilled ceramicists would be familiar with how to determine the relevant starting density". Halloran further notes that it is both well known to measure the starting density of the ceramic blank and that efforts are routinely made to control this factor as a matter of ordinary practice in the art (see page 2, first and second paragraphs).

Finally, Halloran states that calculation of the enlargement factor is such a notoriously well know practice in the ceramic arts that the manner of its calculation "need not be specified in detail".

Although Halloran does not explicitly teach Applicants recited enlargement factor formula, Halloran makes plain that Applicants recited formula would have been considered as an obvious extension over Wohlwend for one of ordinary skill in the art at the time of the invention. Further and as noted above, Applicants claimed enlargement factor is based upon scientific theories and mathematical constructs which would have been well known by skilled practitioners in the art at the time of the invention. In short, Applicants claimed enlargement factor is insufficient to patentably distinguish the claimed invention over the Wohlwend disclosed manufacturing method in view of the ordinary level of skill in the ceramic arts at the time of the invention as established by the Halloran Letter.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Jason L Lazorcik/

Primary Examiner, Art Unit 1791

Conferees:

/Christopher A. Fiorilla/

Chris Fiorilla

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